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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/792,003

03/02/2004

Yiping Hu

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EXAMINER

AUSTIN, AARON

ART UNIT

PAPER NUMBER

1775

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/17/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/792,003

Applicant(s)

HU ET AL.

Examiner

Aaron S. Austin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 10, 12, 13, 16, 30, 31, 34-36, 38-41 and 43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10, 12, 13, 16 and 30 is/are allowed.
- 6) ☒ Claim(s) 1-6, 31, 34-36, 38-41 and 43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Objections

Claims 1 and 34 are objected to because of the following informalities: the spatial placement of the two coating layers is confusing as written. In particular, how is it that the additional coating layer may be formed on the bottom side of the first coating layer and the first coating layer may be "formed on the substrate"? As claimed, the additional layer could prevent formation of the first coating layer "on the substrate" as required by the claim. Amendment of the claims to read "a first coating layer formed over the substrate" rather than "on the substrate" will overcome this objection at line 3 of claim 1 and line 6 of claim 34.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Patent No. 6,444,259 (Subramanian et al.).

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Subramanian et al. teach incorporation of a separate barrier layer into the bond coat of a thermal barrier coating for a turbine component by varying material properties across its depth (abstract and column 5, lines 5-8). The first portion 60 of the bond coat layer 56 may be a mixture of MCrAlY with rhenium, tantalum, platinum, or alloys thereof (column 5, lines 8-14). The second portion 62 is material selected to maximize the coating's oxidative and corrosion resistance, such as an MCrAlY that does not include platinum (column 5, lines 14-20). More than two such portions may be used (column 5, lines 25-26).

Subramanian et al. do not teach the material of the second portion 62 as being a modified MCrAlY. However, they do teach more than two such portions may be used (column 5, lines 25-26). Therefore, as Subramanian et al. clearly teach the first portion 60 of the bond coat layer 56 may be a mixture of MCrAlY with rhenium, tantalum, platinum, or alloys thereof (column 5, lines 8-14) and more than two such portions may be used (column 5, lines 25-26) with a goal of providing the advantage of a bond coat having varying material properties across its depth (column 5, lines 4-8), it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to form the barrier layer of Subramanian et al. comprising two or more modified MCrAlY first portions 60 having varying material properties such that one of the portions contains Pt and the other does not. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

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Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,444,259 (Subramanian et al.) in view of U.S. Patent No. 5,232,789 (Platz et al.).

Subramanian et al. teach incorporation of a separate barrier layer into the bond coat of a thermal barrier coating as described above.

Subramanian et al. do not teach the material of the second portion 62 as being a modified MCrAlY.

In addition to the arguments set forth above, Platz et al. teach MCrAlYX coatings provide oxidation and corrosion resistance wherein X is a rare earth (column 1, lines 31-42). Therefore, as Subramanian et al. clearly teach the second portion 62 is material selected to maximize the coating's oxidative and corrosion resistance (column 5, lines 16-17) and as Platz teaches MCrAlYX coatings provide the desired effects of oxidative and corrosion resistance (column 1, lines 31-42), it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to form the barrier layer of Subramanian et al. wherein the second portion comprises MCrAlYX wherein X is a rare earth other than Pt. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Claims 1-6, 34-36, 38-40, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,475,642 B1 (Zhao et al.) in view of U.S. Patent No. 6,444,259 (Subramanian et al.), and further in view of U.S. Patent No. 5,232,789 (Platz et al.).

Zhao et al. disclose oxidation-resistant coating compositions formed of an alloy comprising aluminum, tantalum, at least one base metal selected from nickel, cobalt, and iron, at least one precious metal such as platinum, and minor amounts of other elements such as zirconium, hafnium, silicon, and yttrium. Zhao et al. disclose oxidation-resistant alloy coatings for turbine components made from superalloys wherein the alloy coatings contain the same alloying elements as claimed by the applicants with alloy elemental ranges that overlap applicants' claimed alloy elemental range limits. See line 65 in column 1 to line 24 in column 3 and line 35 in column 3 to line 9 in column 9. Further, the thickness of the coating is about 20 to 200 microns (column 8, line 61) or about 75 to 1300 microns for turbine engine components wherein the coating includes a TBC (column 9, lines 5-9). Prior art which teaches a range within, overlapping, or touching the claimed range anticipates if the prior art range discloses the claimed range with sufficient specificity. See MPEP 2131.03 and Ex parte Lee, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993). The Examiner notes that Zhao et al. mention that the oxidation-resistant alloy coatings can be used for protecting turbine engine airfoil components, and those components are expected to have the same structural features (for example, an airfoil having a concave face and a convex face) as claimed by the applicants. Further, Zhao et al. describe examination of the resultant coating using x-ray techniques (column 5, line 34).

Please note, the ranges disclosed by Zhao et al. includes Al at a concentration of 30-55 atom % range which is equivalent to 15-35.5 weight % range (column 3, line 15).

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Further, the alloy taught includes mixtures of precious metals that include four members of Pt, Hf, Si, Zr, Ta, Re, and Ru (column 4, lines 10-13).

Zhao et al. do not teach multiple layered MCrAlYX coatings wherein one layer includes platinum and another does not include platinum.

Subramanian et al. teach incorporation of a separate barrier layer into the bond coat of a thermal barrier coating for a turbine component by varying material properties across its depth (abstract and column 5, lines 5-8). The first portion 60 of the bond coat layer 56 may be a mixture of MCrAlY with rhenium, tantalum, platinum, or alloys thereof (column 5, lines 8-14). The second portion 62 may include a MCrAlY that does not include platinum (column 5, lines 14-20). More than two such portions may be used (column 5, lines 25-26).

Therefore, as Subramanian et al. clearly teach the first portion 60 of the bond coat layer 56 may be a mixture of MCrAlY with rhenium, tantalum, platinum, or alloys thereof (column 5, lines 8-14) and more than two such portions may be used (column 5, lines 25-26) with a goal of providing the advantage of a bond coat having varying material properties across its depth (column 5, lines 4-8), it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to form the platinum including MCrAlY layer of Zhao et al. comprising two or more modified MCrAlY first portions 60 as taught by Subramanian et al. having varying material properties such that one of the portions contains Pt and the other does not. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

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In addition and alternatively to the above-stated argument, Platz et al. teach MCrAlYX coatings provide oxidation and corrosion resistance wherein X is a rare earth (column 1, lines 31-42). Therefore, as Subramanian et al. clearly teach the second portion 62 is material selected to maximize the coating's oxidative and corrosion resistance (column 5, lines 16-17) and as Platz teaches MCrAlYX coatings provide the desired effects of oxidative and corrosion resistance (column 1, lines 31-42), it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to form the barrier layer of Zhao et al. in view of Subramanian et al. wherein the second portion comprises MCrAlYX wherein X is a rare earth other than Pt. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,475,642 B1 (Zhao et al.) in view of U.S. Patent No. 6,444,259 (Subramanian et al.), and further in view of U.S. Patent No. 6,264,039 (Chyi).

Zhao et al. in view of Subramanian et al. teach oxidation-resistant coating compositions as described above. Further, the coatings may be applied in single-stage or multi-stage processes (column 2, lines 36-37) such as EB-PVD, electroplating, IPD, LPPS, CVD, plasma spray, HVOF, and the like (column 7, lines 38-45). These techniques, whether in a single or multi-stage process, may include powder atomization (column 7, line 47).

Zhao et al. do not specifically teach the presence of rhenium in the coating, although they do teach the alloys as containing at least one precious metal, which often

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provides greater oxidation resistance for the coating, in a range of 1 atom % to about 30 atom % (column 4, lines 10-12 and 23-24).

Chyi teaches rhenium is a precious metal having oxidation resistance useful for high temperature applications (column 7, lines 20-26). Therefore, as Chyi clearly teaches rhenium is a precious metal and provides the advantage of use for high temperature applications due to oxidation resistance, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use rhenium as the precious metal taught by Zhao et al. as providing oxidation resistance for the coating. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Allowable Subject Matter

Claims 10, 12, 13, 16 and 30 are allowed.

Response to Arguments

Applicant's arguments, see the Remarks/Arguments, filed on December 13, 2006, with respect to objection to claim 18 and rejection of claims 18 to 29 over Goodwater in view of Zhao et al. have been fully considered and are persuasive in light of the present amendment and arguments. Therefore, the objection and rejections have been withdrawn. Also, upon further consideration, the rejection under 35 USC 112 has been changed to an objection to claims 1 and 34 as set forth above.

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Applicant's arguments with respect to the teachings of Subramanian have been considered but are moot in view of the new ground(s) of rejection.

Regarding Zhao et al., Applicant argues Zhao et al. and Chyi do not teach or suggest a powder composition. However, the coatings the coatings of Zhao et al. may be applied in single-stage or multi-stage processes (column 2, lines 36-37) such as EB-PVD, electroplating, IPD, LPPS, CVD, plasma spray, HVOF, and the like (column 7, lines 38-45). These techniques, whether in a single or multi-stage process, may include powder atomization (column 7, line 47). As such, Zhao does teach application of a powdered composition for coating a superalloy substrate comprising an MCrAlYX composition as claimed. The claim language does not preclude either incremental (multi-stage) or single stage formation, which, in any case, are both taught by Zhao et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron S. Austin whose telephone number is (571) 272-8935. The examiner can normally be reached on Monday-Friday: 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ASA



JENNIFER MCNEIL
SUPERVISORY PATENT EXAMINER

1/11/07